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29 April 1981

Worldwide Report

TELECOMMUNICATIONS POLICY, RESEARCH AND DEVELOPMENT

(FOUO 5/81)

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SUB-SAHARAN AFRICA

WEST EUROPE

JAPAN

JAPAN TO BE FIRST TO LAY LASER BEAM PHONE NETWORK

Tokyo DAILY YOMIURI in English 27 Feb 81 p 2

[Text]

New telephone communication networks using thin glass fibers which transmit voice signals by light will be laid in 12 major areas of the country by spring 1982 the Nippon Telegraph and Telephone Public Corporation (NTT) has announced.

The fiberoptic communication system is said to have been already placed partially in commercial use in the US.

Japan's sole operator of domestic telephone service says that the new system using the most advanced technology on a large-scale basis will be employed for the first time in the world when the networks are completed.

NTT said the networks will be laid in Tokyo, Osaka and other major urban areas to connect them with telephone exchanges in their vicinities.

The fiberoptic networks will extend a total of about 110 kilometers. The wire is of medium size with capacity equivalent to 480-1,440 circuits on ordinary telephone wires, according to NTT.

Construction work to lay the networks will start next month.

NTT said it has decided to undertake the project because of its successful development of techniques to mass produce the optical fiberglass.

Development of a practical semiconductor laser which emits light beams of 1.3 micron wave length, the ideal type of beam for the new communication system, also made it possible to start the project, NTT said.

The new fiberoptic communications system will reduce construction and maintenance costs of telephone networks by some 20 percent. For one reason the fiberglass material is much cheaper than ordinary copper wires. NTT said.

It said it plans to continue experiments to develop fiberoptics with much greater capacity in the near future.

CSO: 5500

JAPAN

INTERNATIONAL DATA SHARING UNDER CONSIDERATION

Background Given

Tokyo NIKKEI SANGYO SHIMBUN in Japanese 20 Jan 81 p 4

[Text] Movements toward the liberalization of communications circuits have suddenly become active. The first step taken in our country which can be called "circuit liberalization" was the 1971 amendment to the Public Electric Communications Law, which opened the way for the dissemination of data communications by ushering in a new exclusive circuit service, the "special communications circuit." A variety of restrictions were imposed in its utilization, however, thereby giving rise to complaints from circuit users and the information processing industry as data communications became increasingly active. This finally produced the "second wave" for circuit liberalization.

"Possibilities for Private Sectors Removed"

The main feature by which the second wave differs from the first wave is the fact that the participation of private industries in the communications service itself, in such facets as value-added communications (a service which adds functions to a circuit rented from the trunk communication industry to make communications more effective) and satellite communications, is included among the subjects for discussion. This makes it impossible not to touch on fundamental problem of communications, such as the propriety of the monopoly held by the Japan Telephone and Telegraph Public Corporation [JTT].

With the opening of the special communications circuit service, not only did on-line service using the exclusive circuits of private information processing industries become permissible for the first time, but also joint utilization of exclusive circuits among the manufacturing industries maintaining continuous mutual transactions or between manufacturers and wholesalers became permissible. However, numerous restrictions were still attached to "outside use" (making circuits available to outsiders by renting them from JTT for commercial purpose) or "joint use" (common use of a single circuit by multiple users), and it was this situation that created the second wave of circuit liberalization.

Another big impetus was DDX (new data network) services which the JTT inaugurated at the end of 1979 in July of last year. Of these, depending on one's viewpoint, the packet exchange service in particular can be regarded as a value-added communication. For this reason, concerned voices were raised, upon its inauguration, among private information processing industries to the effect that "it may block the possibility of private information services."

For instance, last March the Japanese Association of Information Centers (Chairman: Kazuo Kuwae), which is a group of information-processing industries, presented to the Ministry of Postal Services [MPS] and the JTT a proposal "to limit the package exchange service to areas related to the basic communication function, and not to expand it to the area of information processing." It also requested the minister of postal services specifically: 1) to deliberate a revision of the Public Electric Communications Law in the direction of liberalizing the utilization of communications circuits on the basis of long-range perspective; and 2) to consider the possibility of commencing private services through the use of the special communications circuit in order to supplement the JTT's packet exchange service. Also, sometime after this, the On-Line Promotion Committee of the Japanese Information Processing Development Association (committee chairman: Shuzo Inaba)--a juridical person--submitted a similar opinion paper to the MPS and the JTT.

The MPS and the JTT Also Are Forward-Looking

In response to this heightening wave among the private sector for liberalization of circuits, the MPS in the latter part of October of last year established the "Conference for Electric Communications Policy" (chairman: Yoshishige Ashihara, president of the Kansai Electric Power Company) with the purpose of reviewing communications policy. The conference is expected by this summer to formulate "a vision for communications policy in the 1980's" encompassing the entire areas of communications policy. It seems inevitable [that the conference] will touch on the problems of circuit liberalization and monopoly by the JTT and the International Telegraph and Telephone Company (KDD). To be prepared for this, the MPS seems to be moving toward the formulation of concrete policies, including the drafting of a new bill. The recent instruction given by Minister of Postal Services Yamauchi to the JTT concerning the investigation of circuit liberalization can be interpreted as the first step toward the direction of such a policy development.

The proposal entitled "Toward A Dynamic and Decentralized Information Community," presented by a group of economists at its policy planning forum (representatives: Tokyo University Professor Tairyo Murakami and Kyoto University Professor Chikashi Moriguchi) at the end of last year, was also following a similar line on circuit liberalization. Because it pointed out from a professional point of view the harmful effects of the JTT's monopoly of the communications industry and "recommended" the participation of private enterprises in the area of data communications, it drew considerable attention even from persons other than communications-related people.

As a response on the part of the JTT, new director Mafuji expressed his intention to grapple with the problems of circuit monopoly and liberalization with a forward-looking posture. He is expected first to summarize the various arguments hitherto expressed, then to actively participate in the discussions of private research groups related to this field, and finally to commence the deliberation of policy measures for the JTT.

Progress Seen in International Arena

The wave for the circuit liberalization has reached international communications as well. Since foreign users are involved in this area as interested parties, exact responses are required from the KDD. Having this in mind, the KDD proposed relaxing the restricted utilization of international special communication circuits, beginning the 5th of this month.

This allows multiple hookup of computers in the case of outsider use (it is permissible even if more than one of the computers are used by both parties of communicating countries), whereas in the past, only the hookup of one computer to one terminal was allowed. This has been a pending item requested by the information service industry of the United States for several years, and it was considered to be an important question capable of developing into "the second communication conflict between Japan and the United States," next to the problem of the JTT's procurement of materials, depending on the way Japan was to respond to it. Therefore, it can be said that this was a nimble response on the part of the KDD. Prior to this, the KDD last fall allowed the hookup of data terminals and facsimilies to international telephone circuits. This, too, is a sort of circuit liberalization. Thus, it can be justifiably said that circuit liberalization has shown steady progress in the international arena, even though it has not been conspicuous as the domestic case.

Scholars' View

Tokyo NIKKEI SANGYO SHIMBUN in Japanese 9 Jan 81 p 1

[Text] "Toward a Dynamic and Decentralized Information Community," published at the end of last year as a recommendation for data communications policy by "the policy planning forum," a group of economists organized to recommend policy (representatives: Tokyo University Professor Tairyo Murakami and Kyoto University Professor Chikashi Moriguchi), is creating considerable reverberations, such as the immediate response of Postal Services Minister Yamauchi giving instructions to the JTT to review the liberalization of communication circuits. Criticism against JTT's monopoly of the communication industry had previously been launched by the information processing industry and computer users, but this is the first time a group of scholars who are, so to speak, a third party had pointed out problems stemming from the monopoly and has presented a clear conclusion urging free participation in the area of data communications. With excellent timing, the JTT was given a new director from the private sector for the first time, and it is preparing for a fresh start. Hitotsubashi University Professor Kenichi Imai who was responsible for putting the recommendation together, emphasized, when he was asked about its real meaning, the great possibility for the realization of "a diffuse, diverse, and individualized society" as a result of rapid progress in information and communication technology. He showed his willingness to point out further in the future the problematic questions accompanying monopoly, and to work for the realization of the contents of the recommendation. (The questions were put by reporter Hirohito Suzuki.)

--This recommendation stated that the current system of communcation, based on the JTT's monopoly of the communications industry, is not suitable to the era of information revolution, which has reached the "second stage." Specifically, what does this "second stage" mean?

Imai: The first stage of the information revolution up to now tended to be preceded by futuristic arguments for information revolution; therefore they were in a misty condition, so to speak. But the second stage is characterized by its having a tangible substance as a result of the revolution in microcommunications. Computers and communication networks are not confined simply to production aspects, but are beginning to transform enterprises' organizational structures and business patterns. Furthermore, they are beginning to penetrate gradually even to individual life, beginning with the on-line system of financial organizations.

--What is the reason for promoting the second stage of information revolution?

Imai: For one thing, there is a need to supplement the weakness of Japanese society seen from its economic and industrial structure. In order to reduce the degree of dependence on oil, it is necessary to vitalize the flow of information by developing communications networks, on the one hand, and to reduce on the other hand the movement of men and materials.

For another thing, it is important to individualize lifestyles by promoting the information revolution at the level of the people, so that everyone can respond flexibly to environmental changes. This is linked to the strengthening of the social foundation.

--Recent arguments about the information revolution seem linked to the promotion of political, economic, and social diffusion and decentralization. What do you think of this problem?

Imai: It can be said that the second stage of the information revolution is really a response to the trend toward diffusion. The direction that the Japanese industries should take in the future, I think, is to go from the concentrated mode of production to a diffused model, and from standardized products and technology to diversified ones; these new trends are already beginning to emerge, I think. Diffusion of various organizations and individual life into localities is also in progress. A precondition for such diffusion is the development of computers and communication networks, which makes the essential linkage between the loci of diffusion. Basic to the "information society's" surpassing the traditional industrial society is such a socioeconomic structure having both diffusion and linkage.

--In order to promote this information revolution, the JTT's monopoly of communication services and its restrictions on the utilization of communication circuits have detrimental effects--this seems to be the main theme of the recommendation. As for the restrictions on the utilization of communications circuits, the JTT has maintained that "the wants of users have been accommodated through the flexible application of criteria for permits, and there has been no indication of any substantial harm done."

Imai: It is true that there has been a gradual liberalization of circuits, but such methods have created an unfair outcome for users. Moreover, they have entailed the problem of making it difficult for users to chart their future plans. What is needed now is to set forth clearly the policy of circuit liberalization, and to put into practice all at once whatever is feasible. Also, if the JTT is not going to allow the liberalization of circuits, it should clarify the reasons for it.

--One of the main reasons for maintaining the JTT's monopoly has been the matter of insuring a global-scale high standard of technology and services. What do you think of this?

Imai: Such arguments may have been plausible for the traditional communication system centering around the telephone, but the plausibility is dubious for the contemporary setting, where computer and semiconductor technology has made huge progress and its diverse utilization has become available. We are advocating the introduction of competitive principles in the area of data communication, but even in the area of basic communication there are some areas, such as satellite communications, in which technology is sufficiently ready for private industries to render effective service.

As for the problem of the quality of service, the key point to be considered is whether all users want high-quality services. In any service, the users' choice depends on a balance between quality and cost; in communication, too, there must be a large number of users who look for inexpensive cost with the knowledge that quality is not perfect.

--From now on, how do you plan to handle this problem?

Imai: We are not saying that all aspects of the JTT monopoly are bad. We plan to go on analyzing it with two alternate possibilities in mind, and at the same time we will continue to point out matters of a more specific nature.

Industries' View

Tokyo NIKKAN KOGYO SHIMBUN in Japanese 20 Jan 81 p 14

[Text] How should computer centers, the specialists in the information processing services, respond to the needs of their clients and begin to show an ever-increasing degree of diversity and complexity? How should this industry, which is shallow in its history and weak in entrepreneural foundation, be guided to attain heightened growth? Such prospects and direction on the part of the industry might have been fixed 3 years ago if all had gone well, and could have been in the implementation stage with the backing of the country by now. However, the industry was excluded from the category of the designated industries stipulated by the Machine Information Law (Law Concerning Provisional Measures for the Promotion of Special Machine Information Industries), and has suffered from it unexpectedly.

Because the industry entertained the idea that its inclusion among the designated industries would assure its social status, the shock of the party concerned was beyond imagination. The software industry was included in the designation.

It was due to the violent opposition of the MPS that the Ministry of International Trade and Industry [MITI] was obliged to let the computer center industry go off the designation at the last moment. As a response to the era of data communications, which combines computers and communications, MITI, using the aforementioned law for leverage, has aimed at (1) reviewing the Public Electric Communications Law from its fundamental level in order to promote the information revolution of the country's industries; and (2) promoting the information industries of the country by putting the JTT and private information processing industries in the same arena.

Against this, the MPS, which "monopolizes" the administration of communications on the basis of the Public Electric Communications Law, countered by saying: "Communication services are public affairs affecting all the people. They cannot be ruled solely by the Machine Information Law, which is designed to include the JTT simply from the viewpoint of industrial promotion." The alternative which emerged under the auspices of the MPS was the Data Communication Bill, but it has not yet seen the light of day.

At that time, most of the people concerned in the industry kept silent about this series of maneuvers in the administration. At present, however, the voices of those who are demanding at least the liberalization of communication circuits are much louder, saying: "If only we had conditions favorable to do business in the same arena with the JTT, which is rendering services from its superior position...." It is characteristic of the recent times that such voices are spreading not only in that particular industry but all over the industrial world.

Also, there are many industrial leaders who sternly point out: "It is difficult to understand why the obsolete system of the old communications law is insisted on, when we are in the era of linking manmade satellites with computers. In order to make the information revolution of our country bloom with a variety of flowers through the vitality and creativity of private sectors, the liberalization of communication circuits is absolutely essential. Although it is argued that the regulation of communications circuits can prevent the invasion of American businesses, it works contrarily, hampering the development of our country's industries."

In the meantime, the prospects and future direction to be followed by the computer center industry are now being deliberated by the Industrial Structure Deliberation Council, under the rubric called the formulation of "a vision for information revolution. With the participation of representatives from industry, the council is reportedly having lively discussions. The industry's determination and eagerness seem to be so extraordinary that the MITI representatives have reportedly said, with a bitter smile, "Our side has been swayed all the way."

On the other hand, there has also been a strong voice saying: "Were the moaning voices of us small and medium enterprises heard?" It is reported that the investigation conducted the year before last into the industry's basic problems was administered from the subsidy granted as "compensation" for the industry's exclusion from the designation. Through the investigation, however, numerous problems that plagued the industry surfaced so starkly, contrary to expectation, that new emphasis was put on the need for the fostering and growth of the industry.

The leadership of the MITI seemed to be willing for a "return match" even in 1980 [as published], remarking that "if the MPS is inclined to be dilatory, we will give further consideration for the inclusion of the computer center industry in the industrial designation." But this may be troublesome to the industry, which is placed in the valleys of administration, some confess.

9368
CSO: 4105

JAPAN

NEW LAND-MOBILE TELECOMMUNICATION SYSTEM

Tokyo TECHNOCRAT in English Vol 14, No 2, Feb 81 p 72

[Text]

• The influence of buildings on land-mobile telecommunication by dispersing electromagnetic waves makes the intensity of the waves changeable. When AM or SSB systems are used in such communication, fading of the waves may occur. This also happens in medium wave band radio broadcasting, for this reason, land-mobile telecommunication systems such as taxi radios have always used the FM system to provide a good voice quality.

The Radio Research Laboratory, of the Ministry of Posts and Telecommunications, has recently developed a new land-mobile telecommunication system which uses all the frequency bands efficiently, and has the merit of not being easily disrupted by spatial noises. This system was proposed ten years ago for application to sea-mobile telecommunication systems, but has not yet been applied to land-mobile telecommunication.

In this system, the audiofrequency wave forms are broken down into two components, one of which is the amplitude component corresponding to the intensity of voice, and the other which is the frequency component corresponding to the content of talk. The amplitude components are converted to the FM form and then combined with the frequency components. These signals are then transmitted by the SSB system, which is a narrow band communication system. When receiving such radio waves, the above operations are inverted, and the original voice can be reproduced. This system can be characterized as a combination of the merits of both the SSB and FM systems.

Experiments in the laboratory, using the trial apparatus for the new system, have shown that the quality of voice transmitted in this way is superior to that of the SSB and FM systems in places where radio waves are weak, making it suitable for practical use. Although the quality of voice was good, some technical problems were expected in the case of commercial use, such as cross-communication between channels in the wave band used. It was found from the results of experiment that the most adequate frequency intervals between the neighbouring channels were 6 to 7kHz. Since the frequency interval between neighbouring channels in the conventional FM system is 20 to 25kHz, the new system can transmit channels three times larger than the FM system in the same frequency band width.

CSO: 5500

JAPAN

WHITE BOOK 'TELECOMMUNICATIONS IN 1980'

Tokyo TECHNOCRAT in English Vol 14, No 2, Feb 81 p 73

[Text]

The Ministry of Posts and Telecommunications has published a report entitled "Present Status of Telecommunications in 1980". This report has as its main theme "Present Telecommunications at a Turning Point" and describes the present status and future development of the rapidly growing new telecommunications media such as pattern and image communication. data communications and satellite communication. It also emphasizes the necessity of adopting new policies to promote their development, because they would be increasingly important in accompanying the development of an informed. society.

In its introductory chapter, the statistics of various kinds of telecommunication services in 1979 are shown in the Table. Traditional communication media such as mails, domestic telephone, and telegraphs, show minor growth or some decrease, but domestic data communication services are growing rapidly. International telephone and international private communications also show a big growth.

As for new telecommunication media, such as pattern and image communication (facsimile, electronic mail, CATV), data communication, satellite communication, and new digital telecommunication networks, the book analyses their present situation and the economic and social influence of such media and discusses future problems.

The transfer of communications media from telephone, telex, and mail to facsimile, is analysed, and it is expected that facsimile will continue to grow in the future, and will play an important role in office-automation. CATV is smoothly increasing in the number of sets and contracts, but the ratio of contractor to sets is lower than in the U.S.A. (107 persons in Japan, and 3,595 persons in U.S.A.).

As for data communication, the analysis shows that distributed information processing, variations of input and output systems, and organization of information processing are progressing, and all these techniques are related to forming a network of information processing systems. For future development, it is necessary to promote the standardization of communication systems, to establish enterprises for dealing in information processing and telecommunications data, to develop data bases, and to promote security etc.

As for satellite communications, especially broadcasting satellite communication, it emphasizes the necessity to discuss the possible great influences on the present broadcasting systems as well as broadcasting companies.

In conclusion, the book describes how there are now developing some new problems about privacy protection, copyright, security protection of systems and data, and it also emphasizes the necessity of solving such problems. Further, it points out that it is necessary to develop flexible administrative policies because these new media are expected to contribute to wide development of the economic, social, and cultural fields.

Table 1. Productive Amount of Various Telecommunication Services in 1979 Budget Year (Unit: billion yens; the growth rates relative to last year are shown in
1. the brackets with %)

Mail	789.5 (5.2)
Public telephone (NTT)	3,395.0 (5.4)
Wire broadcasting and telephone	18.0 (−1.4)
International telephone (KDD)	68.1 (20.3)
Public telegraph (NTT)	67.4 (−4.0)
International telegraph (KDD)	53.0 (6.4)
NTT private line	86.0 (10.5)
KDD private line	11.1 (16.8)
Public data communication (NTT)	137.4 (18.1)
International data communication (KDD) and etc.	9.0 (18.5)
NHK	214.4 (2.5)
Commercial broadcasting, radio	122.1 (15.7)
Commercial broadcasting, TV	814.7 (12.8)
Total	5,785.7 (6.8)

CSO: 5500

JAPAN

SINGLE-CHIP VOICE CODER-DECODER LSI FOR DIGITAL COMMUNICATION NETWORKS

Tokyo TECHNOCRAT in English Vol 14, No 2, Feb 81 p 73

[Text]

Musashino Electric Communication Laboratory of NTT has developed a single-chip, low power Coder-Decoder, or CODEC LSI. An analog to digital converter, a digital to analog converter and dual channel filters are integrated on a single-chip using CMOS technology, The LSI requires 35mW and is packed in a small 16 pin package. This LSI is expected to be widely applied in various kinds of equipment, contributing significantly to complete digital communication networks.

A CODEC is the key component for realizing digital communication systems, as it functions to convert voice signals into digital signals of 8 bit PCM (Pulse Code Modulation) and reconstruct voice signals from PCM signals.

A CODEC usually consists of an A/D converter, a D/A converter, band limiting filters and internal clock generators. CODEC LSI's based on various kinds of operation principles, circuit configurations and fabrication process have been developed, and some of them have already been commercialized. However, more than two LSI chips have been required for CODEC functions.

The newly developed CODEC LSI has integrated all functions in a single-chip with the size of 4.35mm x 7.0mm, which is packed in a small 16 pin DIP (Dual In-line Package).

New circuit design technologies which reduce the number of circuit elements and crosstalk noise between analog and digital circuits to achieve small chip size have been applied.

To reduce the power dissipation, a power-saving CMOS amplifier design has been developed and the number of amplifiers required has also been reduced from 20 to 15. The LSI employs power-down mode to reduce the power dissipation when no signal is input. Thus, small power dissipation of 35mW (2mW in power down) has been achieved.

On-chip capacitors, switches and high gain amplifiers have been used to achieve high accuracy A/D and D/A converters and filters.

The CODEC operates with ±5V supplies, compatible to logic LSIs, and +2.5V reference voltage source.

Typical CODEC parameters are shown in Table 1. The CODEC LSI is expected to be widely applied for PCM channel banks, digital switching systems and digital private branch exchanges, contributing significantly to the realization of digital communication networks.

Table 1. Typical CODEC Parameters

A/D and D/A conversions	Successive approximation A/D conversion Capacitor array and resistor string-D/A conversion
Filtering	Switched capacitor technique
Sampling frequency	8kHz (single voice channel)
PCM clock frequency	64kHz ~ 2048kHz
Companding law	μ law (A law)
Power supplies	±5V
Reference voltage	+2.5V
Power dissipation	35mW (2mW at power-down)
Package	16 pin DIP

CSO: 5500

JAPAN

BRIEFS

CAPTAIN SYSTEM ANNOUNCED--The Ministry of Posts & Telecommunications, and Nippon Telegraph & Telephone Public Corporation (NTT) recently announced that the Captain system (Character and Pattern Access Information Network) will be put into service from the 1983 budget year. The system is now under experiment with selected monitors among people living in 23 districts in Tokyo. Survey of the experimental users leads to expectation of demands for the Captain system in the near future. Similar systems have been successfully developed in other countries, and it seems there will be international competition among these services. Therefore, the Captain system in Japan must be developed quickly. The experimental Captain system is now available to about 1,000 terminals in the 23 districts in Tokyo. Experimental data show that the number of contacts from the monitors to the Captain service is gradually increasing on the average, and families utilizing the system more than two or three times a week have increased recently. Also, a survey by questionnaire on the Captain system shows that about 53% of the families want to utilize the system when it is fully developed, and about 56% of the families want it to be developed within a few years. It therefore expected that demand for the system will build up after it is fully developed. [Text] [Tokyo TECHNOCRAT in English Vol 14, No 2, Feb 81 p 72]

COAXIAL CABLE STRIPPER--Nagano Co., Ltd. has developed a coaxial cable stripper, which can strip antenna coaxial cable sheathing very easily and with a clean cut. The steps are: first, insert the cable into a prescribed position and fix it with the fixing lever, with the fingers in the rotating hole, rotate the body to cut the sheathing, and then remove the cable to take off the sheathing completely by drawing it vertically, starting from the cut portion with a knife proved. Core wires also can be easily cut by simply rotating the body to provide cutting. [Text] [Tokyo TECHNOCRAT in English Vol 14, No 2, Feb 81 p 72]

OPTICAL MULTIPLEX TRANSMISSION--Showa Wire and Cable Co has developed a low cost modem which can greatly simplify transmission systems. This modem has the function of enabling multiple data transmission through a single optical fiber cable between the mainframe of a computer and its terminals. Its distinctive feature is the use of the "Time Sharing Bit Multiple System." This system costs, about one half the price of ordinary such apparatus because the number of parts in the multiplexer has been considerably decreased. Because this modem is fabricated by TTL Logic, it also has the following features: (1) there is no limit to the input and output rates; (2) no data goes missing due to the clock error of the bit rate; (3) it has the capacity for 8 channels of start-stop synchronous transmission up to 4,800 BPS. [Text] [Tokyo TECHNOCRAT in English Vol 14, No 2, Feb 81 p 72]

CSO: 5500

CUBA

PROGRESS REPORT ON INSTALLATION OF COAXIAL CABLE PUBLISHED

Havana BOHEMIA in Spanish 27 Feb 81 p 35

[Text] A few days ago, the coaxial cable link between Havana and Matanzas was made. In that connection, it is well to point out the importance of that long-distance communications installation since it establishes the basis for the national long-distance dialing system, that is, direct dialing between one telephone subscriber and another located anywhere in the country.

In its first stage, this link will have a capacity of 60 telephone channels which, as the adjustments and measurements are made to improve the quality of the link, will gradually increase the number of channels in operation between the two cities.

When this system is completed, it will provide telegraph channels and radiobroadcast and television links as well as channels for transmission of data between digital computers.

The cable is made up of various tubes or coaxial lines placed inside a cyclindrical nucleus covered by various insulating materials. At the same time, these tubes are made up of two conductors: one is solid and is of small diameter and goes inside another that is hollow and surrounds the former in a concentric form. The name coaxial is derived from the fact that both cylinders have the same central axis, being separated by small insulating disks spaced at short intervals. This cable is buried underground to prevent any contact with the exterior and it will operate with a voltage of about 800 volts.

During 1980, 212 kilometers of coaxial cable were laid, requiring the excavation of 155 kilometers, most of it in rocky terrain. In addition, 8.9 kilometers of underground telephone conduit were built; in addition, 520 splices and the corresponding measurements were made. This has been an achievement in which Soviet technical advisers took a very active part.

The project will continue to progress this year; it is planned to install about 250 kilometers of cable, build more than 10 kilometers of underground telephone conduit, build about 50 unattended repeater stations and double the number of splices made in 1980.

At the same time, construction projects valued at more than 2.5 million pesos and distributed over 11 provinces have been contracted with the Ministry of Construction.

The planning, construction, assembly and implementation of this extraordinary project of the nation's infrasturcture is possible as a result of the collaboration provided by Soviet technicians and specialists. About 100 specialists from the USSR have worked in Cuba and more than 85 Cubans have trained in that country in the various techniques associated with that engineering activity.

The capacity of the coaxial cable being installed in Cuba is sufficient to cover all telephone traffic demands envisaged up to the year 2000.

8711
CSO: 5500

NIGER

TELECOMMUNICATIONS NETWORK, FUTURE PLANS DESCRIBED

Paris JEUNE AFRIQUE in French 11 Mar 81 pp 6-8

[Text] A vast country with 1,267,000 sq km, with a low population density, in which the landlocked territory is bounded by frontiers with 7 countries (3 of them with no coastline), Niger has undertaken an operation vital for its economic, cultural and political development.

The goals of this operation are:

extension of the telecommunications and television network, such as to allow complete coverage of the north and far eastern part of the country and the improvement of international links;

full automation of the telephone network;

proper equipment of the rural zones with telephones and telex, possibly utilizing solar energy; and

improvement of the urban telephone network and mail distribution.

In fact, no nation can neglect postal and telecommunications services. Along with the roads, they constitute the nervous system of any social body, the desire of which is to grow harmoniously. Spectacular in terms of their scope and conception, the achievements and progress will speed up the economic development of the Bilma, Diffa, Arlit and Agadez regions. The axis described by the two last mentioned places plays a vital role in the economy of the country: its subsoil contains important mineral and energy resources (uranium, coal). Mining companies have developed there in recent years: SOMAIR [Air Region Mining Company], which has been exploiting the open pit uranium deposits in Arlit since 1970; COMINAK [Akouta Mining Company], which has exploited a gallery mine in Akouta since 1978; SONICHAR, with a power plant which was commissioned last 15 January, has been extracting coal at Anou-Araren for several months; and soon, the Tassa N'Taghalgue Mining Company (SMTI), which will exploit the Arni uranium deposit, will join them.

Tools of a regional policy, these undertakings will also make it possible, through the diffusion of information and knowledge, to achieve political, economic and national cultural unity in the country. In the very near future, thanks to the satellite and microwave links, the people of Niger will be able to make calls direct to Cotonou, Lagos and Lome, without passing through Paris or London. The delays and

interminable waits will be a thing of the past: currently, depending on the day and hour, a telephone subscriber can talk to France in three minutes or...three hours. Gone are the days when it was sometimes difficult to reach someone in Niamey.

Desirous of utilizing the most modern equipment in a sector which is disrupted by a technological revolution every 10 years, the minister of posts and telecommunications decided upon the most reliable technology for interlinking long distance communications (more than 500 to 600 km) with the national network: the satellite telecommunications system. The technology of ground stations linked with the responder of an international network satellite is in fact more reliable over these distances than the traditional microwave band. The maintenance of a system using this latter technology alone is difficult to provide: it requires relays, which must be supplied with energy, every 40 km.

Carried out in several phases, the project, the implementation of which is controlled by the Niger Postal and Telecommunications Office, assisted by the SOFRECOM, which itself is collaborating with Telediffusion of France and France Cable Radio (FCR), represents a total investment exceeding 25 billion CFA francs. The first phase alone, in process now, will cost more than 16 billion CFA francs. The project as a whole includes:

a ground station of large dimensions linked with the Intelsat satellite in the Atlantic Ocean, built in Karma 32 km from Niamey;

four ground stations of moderate size for the national network, with antennae 11.80 meters in diameter, built in Karma, Agadez, Diffa and Bilma. The Bilma station will be built later;

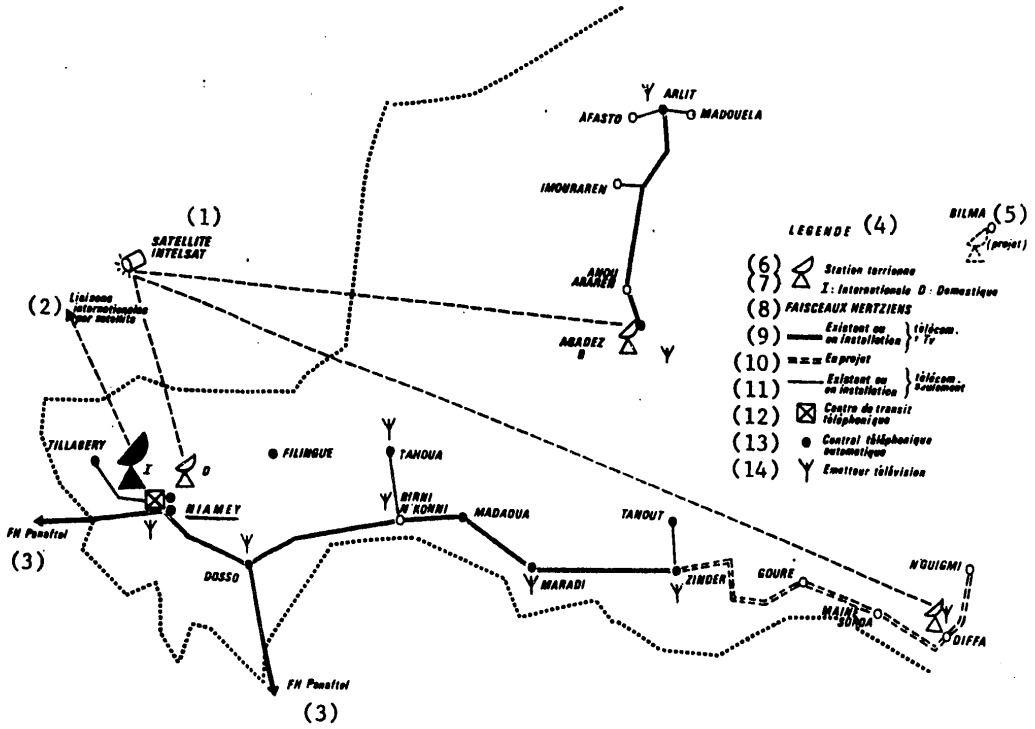
a microwave link 275 km long between Agadez and Arlit, with feeder lines linking the mining companies; and

telephone exchanges in Arlit and Diffa, and expansion of the Agadez exchange and that at the new international relay center.

Making use of the installation of microwave coverage between Agadez and Arlit and the ground stations in Karma, Agadez and Diffa, Niger is pursuing the development of national television on a parallel basis. Transmitters and receivers are being installed in Agadez, Arlit, Ingall and Diffa. One of the existing studios is equipped for color. The premises of the Niamey production center have been expanded, and finally, 250 community television reception centers have been built. The Niger Radio and Television Broadcasting Office (ORTN), assisted by Telediffusion of France and the AUDECAM [University Association for the Development of Teaching and Culture in Africa and Madagascar], is the prime contractor for the television portion.

A French company, Thomson-CSF [General Radio Company], is executing the various telecommunications projects--with the exception of the Agadez exchange, which has been entrusted to the General Telephone Construction Company (CGCT), and the television transmitting stations, being built on turnkey contracts. The commissioning dates will fall between March and September of this year, 1981.

Beginning in mid-April, the citizens of Niger will be able to watch the direct relay of the Sixth Youth Festival which will be held in Diffa on small color screens (SECAM [sequential memory color] system). Hundreds, even thousands of persons will thus be able to watch, cheer and boo the participants in these cultural and athletic programs in front of their own sets.



Key:

1. Intelsat satellite
2. International satellite links
3. PANAFTEL [Pan-African Telecommunications Network] microwave links
4. Legend
5. Bilma (project)
6. Ground station
7. I--International; D--Domestic
8. Microwave links
9. Existing or being installed; telecommunications and television
10. Planned
11. Existing or being installed; telecommunications only
12. Telephone relay center
13. Automatic telephone exchange
14. Television transmitter

The impact of the television image on a population to which the written press does not mean much is in fact tremendous. Television coverage of the country will thus have become a reality very rapidly, thanks to the personal determination of President Seyni Kountche. The chief of state in fact gave the green light for this program following the enthusiasm aroused in the population by the rebroadcasting of the "world" telecast on school television.

A similar political sponsorship is seen and confirmed in the desire to establish a modern telecommunications network. The major efforts made since 1976 are evidence of this. More than 8 billion CFA francs (8,470,900) were invested within the framework of the 1976-1979 3-year program. A microwave link of great capacity equipped with telecommunications and television channels was put into service between Niamey and Zinder.

Microwave links were provided between Konni and Tahoua. Three additional microwave links were established between Ouallam and Banibangou, Maradi and Dakoro, and Zinder and Tanout.

The ground station in Goudel, five km from Niamey, interlinked with a satellite in the Intelsat system for international links with Algeria and France, was put into service. It is also equipped to receive and retransmit television programs. Finally, the carrier current equipment for telephone and telex service between Zinder and Diffa, and automatic urban networks were installed.

Parallel to the installation of the PMETT, other projects are being carried out. The telephone exchanges in Niamey and Maradi have been expanded, and new exchanges have been built in Dosso, Tahoua and Zinder. An international relay center is being built. The link between Niamey and Agadez is equipped for single-sideband (SSB) communications. Finally, the Nigerien portion of the Pan-African Telecommunications Network (PANAFTEL), financed for the five countries in the region (Benin, Niger, Upper Volta, Mali and Senegal) by the Canadians, is developing. It will be solicited within a few months for two projects: the Maradi-Kano channel in the PANAFTEL link between Niger and Nigeria and the Liptako-Gouma service link.

In 1983, in which year the five-year plan will end (almost 20 billion CFA francs have been allocated for the telecommunications program during these years) and the year of the 10th anniversary of the seizure of power by the army, Niger will be equipped with a modern telecommunications network.

Already today all of the major cities (Niamey, Zinder, Maradi, Tahoua, Agadez, Dosso, Arlit, Madaoua, Filingue) are equipped with an automatic network. The commissioning of the Niamey-Zinder microwave link made it possible to make interurban communications between Niamey and Maradi, Niamey and Zinder, and Maradi and Zinder automatic.

In the next five years, the majority of the district capitals will have automatic systems and will be linked directly with at least their regional urban center. The major centers will be linked by automatic interurban facilities with Niamey. The vast majority of Nigerien telephone subscribers will have access to automatic international service. The same efforts to insure speed and certainty will also have made the improvement of mail distribution possible.

5157
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INTERNATIONAL AFFAIRS

FRANCO-GERMAN DIRECT TV SATELLITES GET GO-AHEAD

Paris AIR & COSMOS in French 14 Mar 81 p 43

[Article by Pierre Langereux: "Go-Ahead Given French and German Direct Broadcast TV Satellites"]

[Text] Construction of the first French TDF-1 and German TV-Sat direct broadcast TV satellite is now underway.

Their production was approved at the 9 March 1981 meeting of the joint Franco-German steering committee comprised of representatives from the French CNES [National Center for Space Studies], the French Television Broadcasting Agency, the German Postal Service, and the German Ministry of Research and Technology (BmFT). The committee actually froze the technical definition of the satellites and approved the technical and financial proposal submitted by Eurosatellite GmBH, the Franco-German organization comprising the principal industrial firms responsible for construction of the satellites.

The Franco-German direct broadcast TV satellite program was approved on 2 October 1979 by President Valery Giscard d'Estaing and Chancellor Schmidt. That decision was followed by the signing of an intergovernmental agreement in Paris on 29 April 1980. The Franco-German agreement and its technical and financial appendices call for the joint development and construction of two pre-operational satellites, one per country, and a third unit to be kept as a spare on the ground.

Eurosatellite's detailed industrial proposal for development of the satellite was submitted to the steering committee on 21 October 1980, but the final financial proposals were submitted only in February 1981.

The steering committee finally approved a total financial package of 520 million deutsche mark (at 1980 prices), or slightly more than 1.2 billion francs, for joint development and construction of the pre-operational satellites. Germany and France are to share equally in financing the program with 260 million deutsche mark contributed by the former and 625 million francs by the latter. But the industrial tasks will be deliberately distributed unequally with 54 percent going to Germany and 46 percent to France because of France's majority participation in the Ariane launch vehicle program. The French share in the overall TDF-1 program, including construction and launching of the satellite, will amount to approximately 980 million francs. This includes complete launch costs (with insurance) plus the

transmitting earth station, all separately financed on a strictly national level. The Eurosatellite GmBH group formed in 1978 comprises the program's major French, German and Belgian industrial participants. MBB [Messerschmitt-Boelkow-Blohm] is responsible for coordinating development of the satellites in cooperation with Aerospatiale. Thomson-CSF is responsible for the payload in cooperation with AEG Telefunken. Both countries will share responsibility for integration of the satellites. TDF-1 will be integrated in Cannes by Aerospatiale while TV-Sat will be integrated by MBB in Munich where the joint project management team will also have its office.

Participation by ECTA [Aerospace Engineering Design and Manufacturing Company], a Belgian firm, is still conditional, however. The Belgian Government has another 4 months in which to confirm its participation in the program. In the event of no such confirmation, ECTA would be eliminated from the program.

On the other hand, the Franco-German steering committee has approved participation of the Swedish space industry--SAAB and L. M. Ericsson--in construction of the French and German satellites, in exchange for Eurosatellite's participation in development of the Future Swedish communications and direct broadcast TV satellite TELE-X scheduled for launch in 1986.

Sweden is to commit itself to use certain components of the Franco-German satellites particularly the platform and some parts of the payload. In exchange specific proposals were made to Swedish industry relative to development of such elements of the Franco-German satellites as electronic equipment, antennas, structures, ground facilities, etc.

Definition of the Franco-German direct broadcast TV satellites is now frozen. Contrary to initial plans, it is now planned to have two identical satellites, payloads included. The only exceptions to this policy are the antennas which necessarily have to be adapted to each satellite's specific coverage.

Each satellite will actually have five installed channels, but with only three active channels capable of relaying as many TV programs. There will be a total of six traveling-wave tubes (TWT) per satellite, with one of the channels having two tubes that can be switched in orbit. This will thus enable each satellite to have three fully redundant active channels.

Thomson-CSF and AEG Telefunken will share equal development responsibility for the six tubes in order to test both models of these new high-powered TWT's.

All other specifications of both satellites will remain as previously announced. They will each have a launch weight of approximately 2.3 tons and a weight of 1.15 tons in geostationary orbit, thus utilizing the full launch capability of the future Ariane 2 launch vehicle.

It was initially planned to launch the two satellites in 1983 and 1984. Their launch dates are now firmly set for the latter half of 1984. Reservations have been made with Arianespace for these two launches: August 1984 for the German TV-Sat and December 1984 (or early 1985) for the French TDF-1. The satellites

will have a design lifetime of 7 years. French space officials now have to prepare the "operational follow-on" to the first satellite, in other words, make preparations for the construction and launch of those future satellites that will provide direct broadcast TV public and commercial service in France. This decision will have to be made within the next 12 to 18 months in order to be able to launch the first operational satellite 2 years after the pre-operational TDF-1.

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ITALY

EXPERIMENTS WITH VIDEOTEX SYSTEM TO BEGIN WITHIN YEAR

Milan IL MONDO in Italian 13 Mar 81 p 88

[Article by Marco Gambaro: "With the Stock Exchange on the Line"]

[Text] In the coming years, the television set as it is today will be only a memory. Indeed, the TV set is on its way to becoming a multipurpose terminal, capable of receiving and transmitting information, data and messages of all types. The first step in this direction is the introduction of videotex. The TV set is connected, through the telephone network, with a data bank with which it can converse and from which it can request data and information that then appear on the screen. First developed by the English Post Office in 1979, under the name Prestel, videotex is undergoing experimentation in some 15 countries. Italy is now among them.

At the end of this year or, more probably, at the beginning of 1982, the service called Videotel will begin in an initial experimental phase that should last a couple of years. After a period of uncertainty and differences with the Ministry of Post & Telecommunications, management of the system has been assigned to the SIP [Italian Telephone Company], which set up a working group at the end of 1980. Three weeks ago, it was decided to purchase the software and know-how of the Prestel system. In April, the General Electric Company computer, the heart of the system, will be installed in Milan. For the time being, the investment will be between 600 and 700 million, which will greatly increase when it becomes necessary to buy the computers and software for the definitive service. The SIP has also asked informally for the collaboration of the Italian national electronic industries. Zanussi and Voxon, in particular, should produce 400 to 500 terminals by the end of this year and another 1,000 next year.

What still has to be done is the preparation of the information that will be available. Generally speaking, it will be the same as the English information--that is, weather forecasts, stock-exchange quotations, rail and airline timetables, recipes, do-it-yourself ideas and a pile of commercial and statistical information useful to professional subscribers at most. At the beginning, a total of about 50,000 pages, furnished by some 30 information centers, will be consultable. To connect the television set to the system, a Modem adapter costing 200,000 to 300,000 lire will be required. Business-user installations, though, will probably comprise videoterminals complete with monitor and keyboard, at a price of about 2 million lire.

The experiment will be conducted on a national scale with a thousand users who want to use Videotel right from the beginning. To hook up, it is not necessary to pay

any additional rental fee; it will be enough to have a terminal with an adapter. One then pays for individual connections, in accordance with three different parameters: time of use of the telephone network, independently of distance; real use of computer time; the per-page cost of information, which is variable with value (in the English Prestel system, advertising information is free of charge, but certain commercial data cost up to half a pound sterling--a little more than 1,000 lire--per page). "In any case, the rates will be kept sufficiently low," Giancarlo Ruzza, in charge of the SIP working group, stated to IL MONDO, "so as not to put users off by excessively high costs, for a service whose development it is still difficult to estimate."

With Italy, there are six European countries that have purchased the software of the English system, while the others are using the French Teletel system, which is different and not compatible with Prestel. But what is involved for the time being is in any case experiments of a provisional character.

The ITTCC (International Telephone and Telegraph Consultative Committee) conference that is to establish a single international standard, to which the various systems will have to conform, will in fact be held in Geneva in 1984.

11267
CSO: 5500

OPTICAL FIBER CABLES USED TO CONNECT ROME'S PHONE EXCHANGES

Milan IL MONDO in Italian 20 Mar 81 pp 95-96

[Article by Sergio Mello-Grand: "Eye to the Telephone"]

[Text] In Rome, seven telephone central offices have been connected by optical fibers. It is the first step toward a revolutionary technology. And within 10 years...

The cable-laying has ended. In recent days, they have been making the last connections. And in the coming months, the first connection in Italy--no longer just an experimental one--between central offices by means of optical-fiber cables will become operational. The project is called Cos 3 Foster and involves 288 km of cables installed along a run of 16 km between 7 central offices in Rome belonging to the SIP [Italian Telephone Company] and the ASST (State Agency for Telephone Services).

Cos 3 Foster is a project of the CSELT [Telecommunications Research and Study Center], the research laboratory of the IRI [Industrial Reconstruction Institute]-STET [Telephone Finance Corporation] group, and it has involved Pirelli. for the optical-fiber cables; the SGS-ATES [Electornic Components Company] for the integrated components; ITALTEL for the transmission systems; and the SIRTI [telecommunication company] for the installation. The project is not an absolute first: in Turin, in fact, Cos 1 and Cos 2 are already in operation. The first is a cable 1 km long, composed of six fibers and installed in the vicinity of the CSELT itself. Cos 2 is a somewhat bigger commitment: it involves two cables, the first of which, uniting two central offices, is 4 km long and is formed of three fibers, while the second is 1 km long and is composed of seven fibers. But these are expe_imental projects. The Roman project represents the first step toward industrial-scale utilization of a technology that could revolutionize the Italian telephone system in the next decade.

An optical fiber consists of a thin strand of silica or glass, with diameter generally less than 2/10 of a millimeter, that transmits pulses of light. The material of which the fiber is made is not homogeneous if viewed in cross-section: the central part (nucleus) is in fact coated with a band (mantle) that has the function of keeping the light rays propagating along the nucleus from dispersing to the outside. This happens because the nucleus and the mantle have different refraction capacities: that of the nucleus is very high, while that of the mantle is very low. By virtue of these properties, light introduced at the beginning of a fiber runs longitudinally for its entire length with practically no dispersion at all, as if it

were traveling inside a hypothetical tunnel microscope of mirrors. Use of optical fibers in a telecommunications system is accomplished by means of a transmitter that transforms the electrical signals into optical signals. At the end of the cable, the latter are changed back into electrical signals again. The advantages consist in the fact that an infinitely higher quantity of signals can be transmitted through an optical fiber than through the traditional coaxial cables, without electromagnetic disturbances and in a smaller bulk. The end costs are also lower.

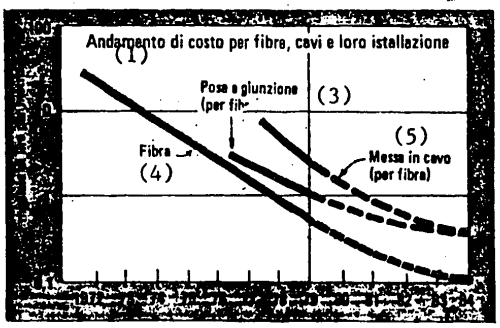
The most important requirement that an optical fiber must satisfy in order to be effective is the purity of the materials that constitute it. This indeed is the factor that has always been the retardant to expansion of this means of transmission: with normal glass fibers, a run of just a few meters would be enough to cut the intensity of the light ray in half. And this would make the interest of optical-fiber transmission applications practically nil. Giant steps have been taken in this field in recent years: the American company Corning Glass Works, which is the world leader in this sector, and the Japanese of Fujitsu have achieved an infinite reduction of the interference from metallic ions, the principal element of fiber impurity. The purity of a fiber is important because it makes it possible to run great distances without the need of expensive repeaters to strength the signal weakened by dispersions.

With the fibers in existence today, practically any distance desired can be reached. The bottleneck that all the research institutes of the major companies in the sector have concentrated on overcoming has become a different one: the transmitter that transforms the electrical signals into optical signals. Light-emitting diodes (LED) or semiconductor lasers are presently being used for generating optical pulses, and photodetectors for reception. In all of these, semiconductors, which represent the nodal point of electronics, are the basis of the technology. It is the progress in this field that will make it possible to take bigger steps forward in the use of optical fibers for telecommunications and to go from the fibers of the first generation (the present ones) to those of the second and third generations.

Taking steps forward means increasing the quantity of light pulses transmitted per unit of time. Within the framework of the Rome project, the transmission is done with 34-million-bit systems (a bit is a unit of measurement of binary information) per second (potentially capable of handling more than 500 telephone calls simultaneously on a single optical fiber). These systems will gradually be accompanied by more powerful laser units of 140 million and 560 million bits per second. In the laboratories of the CSELT, a system has recently been developed that is capable of achieving optical-fiber transmission at the speed of about 1.2 billion bits per second; theoretically, this means a capacity of 18,000 simultaneous phone calls on a single fiber.

The advantages are also of an economic type. The gradual drop in the prices of optical fibers has almost brought them down to $0.10 (100 lire) per meter--a level which, compared with the costs of coaxial cable, already makes them suitable for optical-fiber systems when the transmission rate is higher than 8 million bits per second. The cost of optical fiber is now a minor component in comparison with the cost both of putting the fibers into cables and of cable installation (see graph). Within the framework of the Cos 3 Foster project, the ratio between fiber cost and final cost of installed cable is 1 to 7.

Cost Falling



Key:
1. Evolution of cost for fibers, cables and their installation
2. 1,000's of lire per meter
3. Laying and connecting (per fiber)
4. Fiber
5. Putting into cable (per fiber)

All this constitutes a great opportunity for the Italian telecommunications sector, which has been having difficulties for some time, especially in the urban areas.

Will it be exploited? The Ministry of Post & Telecommunications' draft plan for telecommunications provides, for the current year, for experimentation with the optical fibers of the second generation and with installation of aerial optical cables. A 30-km cable containing 12 optical cables for experimentation on systems for transmission of 140 million and 565 million bits per second will also be installed. During 1982 and 1983, the building of five pilot installations is planned, with a total length of about 90 km (2,000 km of optical fiber), to be equipped with systems of 8 million and 34 million bits per second.

The beginning of systematic use of optical fibers in the urban and sectorial network is planned by the ministry only for 1985. But if this deadline is adhered to, Italy could within 10 years draw even with the positions reached by the other industrialized countries.

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